

REVISION OF THE GENUS *LOXA*  
(HEMIPTERA: PENTATOMIDAE)

Joseph E. Eger II<sup>1</sup>

*Abstract.*—Eger II, Joseph E., Department of Entomology, Louisiana State University, Baton Rouge, La. 70803.—A key is provided to separate *Loxa* and four other American genera of similar appearance: *Chlorocoris*, *Chloroepela*, *Fecelia* and *Mayrina*.

The genus *Loxa* is redescribed and the species are described, or redescribed, and keyed. Of the 10 included species three are new species: *Loxa melanita*, from Peru, Brazil and Guyana; *L. parapallida*, from Peru; and *L. peruviansis* from Peru.

New synonymy recognized is *Loxa planifrons* Barber & Bruner, 1932, as a junior synonym of *L. pallida* Van Duzee, 1907; *L. flavicollis obtusa* Horvath, 1925, and *L. prasina* Horvath, 1925, as junior synonyms of *L. virescens* Amyot & Serville, 1843; *L. assimilis* Horvath, 1925, *L. columbiana* Horvath, 1925, *L. exsul* Horvath, 1925, *L. orthacantha* Horvath, 1925, *L. scutellaris* Horvath, 1925, and *L. vicina* Horvath, 1925, as junior synonyms of *L. viridis* (Palisot de Beauvois, 1805).

A lectotype and paralectotype are designated for *L. florida* Van Duzee, 1909, and *L. flavicollis obtusa* Horvath, 1925; and a lectotype is designated for *L. picticornis* Horvath, 1925.

*Loxa haematica* is considered to be a *nomen dubium*.

Received for publication September 16, 1977.

---

Introduction

The genus *Loxa* Amyot & Serville is similar in appearance to four other small tropical genera: *Chlorocoris* Spinola, *Chloroepela* Stål, *Mayrinia* Horvath and *Fecelia* Stål. The last three genera have been revised recently (Grazia, 1968; Grazia-Vieira, 1972; Grazia-Vieira, 1973). All five genera may be recognized from descriptions and diagnoses in the literature, but no previous key separated all of them. A key is provided here to facilitate recognition of each, and the genus *Loxa* is redescribed.

The last revision of *Loxa* was based on so few specimens that intraspecific variation was underestimated (Horvath, 1925). Characters used by Horvath, such as color, length of antennal segments and the ratio of the length of the humeral spines to the breadth of the interocular vertex, were found to be quite variable within species. In addition, the male genitalia, which were found to be relatively consistent within species, were not used by Horvath.

Consequently, many junior synonyms were created and the key to species was unreliable.

In the following revision the key to species and descriptions, or redescrptions, of species emphasize the morphology of the parameres, proctiger and first gonocoxae. These structures, in most cases, show distinct interspecific differences and little intraspecific variation.

The terminology used for genitalia is that of McDonald (1966).

### Key to Genera of Similar Appearance

1. Ostiolar rugae very long, extending  $\frac{1}{2}$  or more width of metapleuron from ostiolar orifice to lateral margin, evanescent apically from ventrolateral view. *Chloroepela* Stål, 1867
  - Ostiolar rugae extending less than  $\frac{1}{2}$  width of metapleuron from ostiolar orifice to lateral margin, somewhat spatulate apically from ventrolateral view 2
2. Superior surface of femora broadly rounded at apex *Chlorocoris* Spinola, 1837
  - Superior surface of femora armed with acute spine at apex 3
3. Distal end of ostiolar rugae evanescent in profile *Mayrinia* Horvath, 1925
  - Distal end of ostiolar rugae truncate in profile 4
4. Ostiolar rugae short, extending  $\frac{1}{5}$ – $\frac{1}{6}$  width of metapleuron from ostiolar orifice to lateral margin *Loxa* Amyot & Serville, 1843
  - Ostiolar rugae relatively long, extending approximately  $\frac{1}{3}$  width of metapleuron from ostiolar orifice to lateral margin *Fecelia* Stål 1872

### *Loxa* Amyot & Serville, 1843

*Loxa* Amyot & Serville, 1843, p. 137, 198—Stål, 1867, p. 24 (keyed)—Walker, 1867, p. 241 (listed)—Stål, 1872, p. 36 (synonymy)—Distant, 1880, p. 70 (synonymy)—Lethierry & Severin, 1893, p. 149 (listed)—Kirkaldy, 1909, p. 96 (synonymy, names *flavicollis* type species)—Van Duzee, 1917, pp. 54–55 (synonymy)—Hart, 1919, p. 178 (keyed)—Horvath, 1925, pp. 307–324, tab. 4–5—Blatchley, 1926, p. 153 (description)—Barber & Bruner, 1932, p. 285 (keyed)—Barber, 1939, pp. 286, 295 (keyed)—Torre-Bueno, 1939, pp. 207–208 (keyed)—Bruner & Barber, 1949, p. 148 (listed)—Ruckes, 1952, p. 6 (synonymy)—Alayo, 1967, pp. 21–22 (keyed).

Dorsum pale green to dark blue green (apparently often discolored brown in part or whole), densely punctured concolorously or with red, moderately convex transversely behind humeri, strongly declivent before humeri. Venter generally lighter in color than dorsum (frequently discolored), strongly convex transversely, moderately punctured.

Head subtriangular; fine lines directed anterolaterad on anterior part of jugae, transverse on disk, tylus and jugae posteriorly; punctation mostly arranged in longitudinal bands (may be lacking in *pallida*). Jugae surpassing tylus, lateral margins convergent. Antennae 5 segmented; apex of first segment reaching apex of head or nearly so; segments 2-5 each distinctly longer than first segment; antenniferous tubercles visible from dorsal aspect.

Bucculae evanescent basally; each tooth near anterior limit angulate to rounded. Rostrum reaching middle of metathorax to posterior margin of third abdominal segment; basal segment distinctly surpassing distal end of bucculae.

Pronotum densely punctured, with transverse rugae separated by fine lines connecting punctures. Apex slightly wider than breadth of head across eyes, rarely by more than length of first denticle. Anterolateral margins denticulate; submarginal band of punctures moderately to strongly more dense than those of disk. Cicatrices well defined, usually possessing distinct tubercle, (obscure or absent in *planiceps*). Humeri usually produced into acute spines (except in *peruviansis*), moderately to strongly elevated.

Scutellum transversely convex, densely punctured, especially so posteriorly and laterally, 1.4 times longer than wide to subequal in width and length. Coria densely punctured; punctures becoming increasingly smaller and more dense posteriorly, forming dense submarginal band laterally on each corium; irregular scattered pale calli usually present; posterior angles reaching middle to slightly surpassing posterior margin of sixth abdominal segment. Frena extending approximately two-thirds length of scutellum. Membranes clear, immaculate or with scattered colored spots. Connexiva slightly lighter than or concolorous with dorsum; scattered punctures most dense near intersegmental sutures. Tergites slightly lighter than or concolorous with connexiva, impunctate.

Thoracic pleura moderately punctured with red or concolorously. Evaporative area from base of ostiole approximately  $\frac{3}{4}$  width of metapleura, frequently with fine irregular lines. Prosternum longitudinally concave; mesosternum moderately carinate mesally; metasternum nearly flat. Apex of each femur produced dorsally into narrowly angular to acute spine; tibiae sulcate. Abdominal sternites most densely punctured laterally, usually impunctate mesally; medial spine at base of abdomen lacking. Sixth visible abdominal segment of males and eighth paratergites of females produced posteriorly, usually forming distinct spine.

Spermathecal bulb with three digitiform processes. Proximal and distal flanges of pump distinct. Median dilation of spermathecal duct evenly produced, surrounding sclerotized rod (Fig. 5).

Posterior margin of pygophore subquadrate dorsally, subtriangular ventrally. Dorsolateral inner margin of genital cup with distinct denticle on each side about halfway between anterior and posterior limits of cup (except in

*deducta*). Superior ridge emarginate mesally. Inferior ridge strongly developed, forming vertical wall mesally; dorsal margin of wall with pair of pygophoral appendages; appendages (in *parapallida*, *pallida*, *planiceps* and *nesiotes*) with distinct recurved hooks overlapping posterior face of inferior ridge. Proctiger strongly ridged dorsolaterally, variously constricted mesally, deeply concave for approximately caudal half; concavity enclosing striate membrane. Parameres complex, with several processes. Theca large, acentric, constricted mesally, strongly attached to floor of pygophore by large basal plates. Thecal shield bowl-shaped; vesica surrounded by sheath. Conjunctival appendages absent (Figs. 25, 26).

*Distribution*.—Southern Texas and Florida south to Uruguay, Argentina and southern Brazil; restricted to New World.

*Type species*.—*Cimex flavicollis* Drury by subsequent designation (Kirkaldy, 1909).

*Comment*.—The species of *Loxa* are quite variable in color of preserved specimens, ranging from orange-brown and tan to blue-green. The greens are lost upon submersion in hot water, presumably also upon exposure to other high temperatures. The structure of the theca and spermatheca are relatively homogenous, interspecific variation being minimal. In contrast, the parameres and proctiger of males differ among species as do the first gonocoxae of most species, making identification possible in most cases by these structures alone.

#### Key to *Loxa* Males

- |                                                                                                                   |                           |
|-------------------------------------------------------------------------------------------------------------------|---------------------------|
| 1. Pygophoral appendages each with distinct caudal hook (Figs. 29, 33, 37, 41)                                    | 2                         |
| – Pygophoral appendages each without distinct caudal hook                                                         | 5                         |
| 2. Lateral margins of dorsolateral parameral processes spiculate                                                  | 3                         |
| – Lateral margins of dorsolateral parameral processes glabrous, lacking spicules                                  | 4                         |
| 3. Humeral spines weakly produced, distinctly curved caudad (Fig. 34)                                             | <i>planiceps</i> Horvath  |
| – Humeral spines angled slightly caudad at most, usually projecting laterad, sometimes curving cephalad (Fig. 38) | <i>nesiotes</i> Horvath   |
| 4. Lateral margins of dorsolateral parameral processes convex from caudal view (Fig. 33)                          | <i>pallida</i> Van Duzee  |
| – Lateral margins of dorsolateral parameral processes slightly concave from caudal view (Fig. 29)                 | <i>parapallida</i> n. sp. |
| 5. Lateral carina of genital cup distinctly spiculate (Fig. 20)                                                   | <i>deducta</i> Walker     |
| – Lateral carina of genital cup not at all spiculate                                                              | 6                         |

- |                                                                                                 |                                      |
|-------------------------------------------------------------------------------------------------|--------------------------------------|
| 6. Posterior dorsal face of proctiger with pair of distinct spines (Figs. 7, 15)                | 7                                    |
| – Posterior dorsal face of proctiger lacking distinct spines                                    | 8                                    |
| 7. Dorsolateral parameral processes elongate, distinctly curving mesad (Fig. 16)                | <i>melanita</i> n. sp.               |
| – Dorsolateral parameral processes projecting laterad, not at all curving mesad (Fig. 8)        | <i>virescens</i> Amyot & Serville    |
| 8. Posterior margins of coria broadly rounded                                                   | <i>peruviensis</i> n. sp.            |
| – Posterior margins of coria moderately to strongly sinuous, the lateral angles produced        | 9                                    |
| 9. Dorsolateral parameral processes from caudal view inclined dorsad, rounded at apex (Fig. 24) | <i>viridis</i> (Palisot de Beauvois) |
| – Dorsolateral parameral processes projecting laterad, acute apically (Fig. 4)                  | <i>flavicollis</i> (Drury)           |

#### Key to *Loxa* Females

- |                                                                                                                                                                         |                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| 1. First gonocoxae with mesal margins strongly divergent from base to apex (Fig. 18)                                                                                    | <i>deducta</i> Walker     |
| – First gonocoxae with mesal margins contiguous or nearly so for most of their length                                                                                   | 2                         |
| 2. First gonocoxae each moderately to strongly lobed posteriorly, extending onto ninth paratergites                                                                     | 3                         |
| – First gonocoxae each at most broadly rounded posteriorly not lobed and only narrowly overlapping ninth paratergites                                                   | 5                         |
| 3. First gonocoxae each strongly produced posteriorly, extending onto ninth paratergites $\frac{1}{2}$ or more length of ninth paratergites (Fig. 14)                   | <i>melanita</i> n. sp.    |
| – First gonocoxae each moderately produced into broadly angular to rounded lobe, extending onto ninth paratergites less than $\frac{1}{3}$ length of ninth paratergites | 4                         |
| 4. Humeral spines moderately produced, curving caudad (Fig. 34); length of first gonocoxae from base at meson to posterior apex 1.6 mm or more                          | <i>planiceps</i> Horvath  |
| – Humeral spines strongly produced, projecting laterad to cephalad (Fig. 38); length of first gonocoxae from base at meson to posterior apex 1.4 mm or less             | <i>nesiotes</i> Horvath   |
| 5. Humeri weakly produced, each lacking distinct spine                                                                                                                  | 6                         |
| – Humeri each moderately to strongly produced into distinct spine                                                                                                       | 7                         |
| 6. Posterior margins of coria broadly rounded                                                                                                                           | <i>peruviensis</i> n. sp. |
| – Posterior margins of coria moderately to strongly sinuous, the lateral angles produced                                                                                | 8                         |

7. Length of first gonocoxae from base at meson to posterior apex greater than 1.7 mm; length of second gonocoxae at meson greater than 1.0 mm 8
- Length of first gonocoxae from base at meson to posterior apex less than 1.5 mm; length of second gonocoxae at meson less than 0.9 mm 9
8. Pronotum between humeri traversed by transverse fascia of rugae; coria each with discoidal pale spot; inferior face of basal two antennal segments with fine piceus line *virescens* Amyot & Serville
- Pronotum between humeri lacking transverse fascia of rugae; coria each without discoidal pale spot; basal two antennal segments lacking fine piceus line *flavicollis* (Drury)
9. Posterior margins of coria broadly rounded *pallida* Van Duzee
- Posterior margins of coria strongly sinuous, the lateral angles produced *viridis* (Palisot de Beauvois)

*Loxa flavicollis* (Drury, 1773)

*Cimex flavicollis* Drury, 1773, p. 67, pl. 36, fig. 4.

*Cimex albicollis* Fabricius, 1781, p. 347—Gmelin, 1788, p. 2138.

*Pentatoma flavicollis*: Palisot de Beauvois, 1805, p. 185.

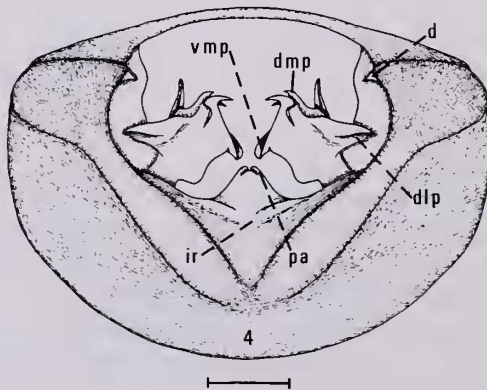
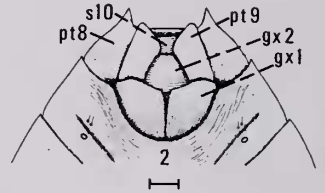
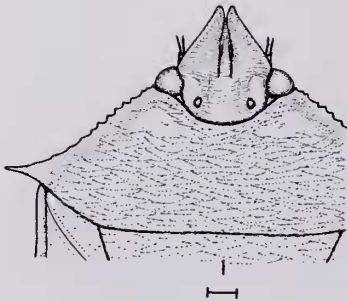
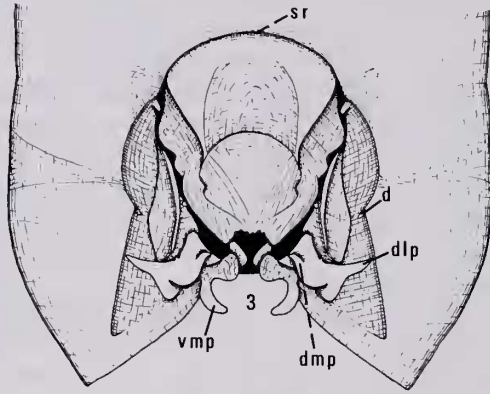
*Loxa flavicollis*: Dallas, 1851, p. 198 (in part)—Stål, 1860, p. 19—Walker, 1867, p. 241 (in part)—Walker, 1868, p. 549 (in part)—Distant, 1880, p. 70 (in part)—Uhler, 1876, p. 290 (in part)—Lethierry & Severin, 1893, p. 149 (in part)—Van Duzee, 1917, pp. 54–55—Horvath, 1925, pp. 319–320, tab. 4, fig. 7, tab. 5, fig. 6 (in part)—Torre-Bueno, 1939, p. 208 (in part)—Bruner & Barber, 1949, p. 158—McDonald, 1966, pp. 27, 51, figs. 224–229, 463 (genitalia)—Alayo, 1967 p. 22.

*Loxa affinis*: Distant, 1892, p. 336 (in part)—Lethierry & Severin, 1893, p. 149—Kirkaldy, 1909, p. 96 (in part).

*Loxa florida* Van Duzee, 1909, p. 156—Barber, 1914, p. 523—Van Duzee, 1917, pp. 54–55—Blatchley, 1926, pp. 28–30—Torre-Bueno, 1939, p. 208—Ruckes, 1952, p. 7.

Length (exclusive of extensions of membranes beyond apex of abdomen)  
♂♂ 16.6–20.7 mm, ♀♀ 18.8–23.4 mm.

Jugae with mesal and lateral band of red or concolorous punctures variable in density; lateral margins nearly straight to slightly undulating (Fig. 1), usually lighter than disk. Tylus with mesal band of red to concolorous punctures for at least basal half. Antennae variable, usually uniformly lighter than disk of head, occasionally tinged with red or slightly darker than disk of head, basal two segments sometimes possessing fine dark brown to piceus line on inferior surface; length of segments (both sexes) 1.2–1.8; 2.0–3.0;



2.2–3.8; 2.7–4.6; 2.2–4.1 mm. Width of head across eyes ♂♂ 4.0–4.7 mm, ♀♀ 4.0–4.9 mm; length ♂♂ 3.4–4.3 mm, ♀♀ 3.4–4.4 mm.

Pronotal rugae uncommonly forming transverse fascia between humeri. Anterolateral margins generally paler than disk, with submarginal band of usually red punctures. Humeri moderately produced into spines, slightly elevated, projecting laterad to slightly cephalad (Fig. 1); red submarginal anterolateral band commonly extending onto each spine; humeral spines red to lighter than disk. Width of pronotum across humeri ♂♂ 11.4–14.6 mm, ♀♀ 10.8–15.6 mm; length at meson ♂♂ 4.2–5.3 mm, ♀♀ 3.8–5.4 mm.

Scutellum with numerous fine irregular calli, these usually pale; width at base ♂♂ 6.0–7.8 mm, ♀♀ 6.3–7.8 mm; length at meson ♂♂ 7.6–9.6 mm, ♀♀ 7.6–9.4 mm. Coria with scattered irregular calli, these usually paler than disk; discoidal spots usually lacking; posterior margins strongly sinuous, lateral angles produced.

Legs concolorous with or somewhat lighter than thoracic pleura, occasionally marked with red; apical femoral spines weakly produced.

First gonocoxae contiguous mesally for most of length, narrowly divergent near apex; posterior margins broadly rounded (Fig. 2); breadth at widest point 1.4–1.9 mm; length at meson 1.8–2.5 mm. Second gonocoxae with shallow longitudinal impression mesally; basal width 1.1–1.6 mm; mesal length 1.0–1.6 mm.

Superior ridge of genital cup moderately emarginate mesally; denticles on each inner dorsolateral margin of genital cup small, obtuse; sides of pygophore caudad of parameres relatively broad, somewhat compressed. Pygophoral appendages lacking distinct caudal hooks. Proctiger with two broadly angular projections located mesally along each lateral margin of posterior concavity; proctigeral spines lacking (Fig. 3). Ventral length of abdominal segments 3–6 at meson 0.8–1.2; 0.5–0.8; 0.3–0.6; 3.7–5.0 mm.

Each dorsolateral parameral process acute apically. Dorsomesal processes each with two short acute lobes; dorsal lobes projecting dorsad, curving mesad; ventral lobes projecting ventromesad. Each ventromesal process bilobed; dorsal lobes projecting dorsad, curving caudad and mesad at narrowly angular to obtuse apex; ventral lobes projecting ventromesad, curving laterad at acute apex (Fig. 4).

---

←

Figs. 1–4. *L. flavicollis*. Fig. 1. Pronotum and head. Fig. 2. Female genital plates; first gonocoxa (gx1), second gonocoxa (gx2), eighth paratergite (pt8), ninth paratergite (pt9), tenth sternite (s10). Fig. 3. Genital cup, dorsal aspect; superior ridge (sr), denticle (d), dorsolateral parameral process (dlp), dorsomesal parameral process (dmp), ventromesal parameral process (vmp). Fig. 4. Genital cup, caudal aspect, omitting proctiger; inferior ridge (ir), pygophoral appendage (pa). Dimensional lines equal 1.0 mm.



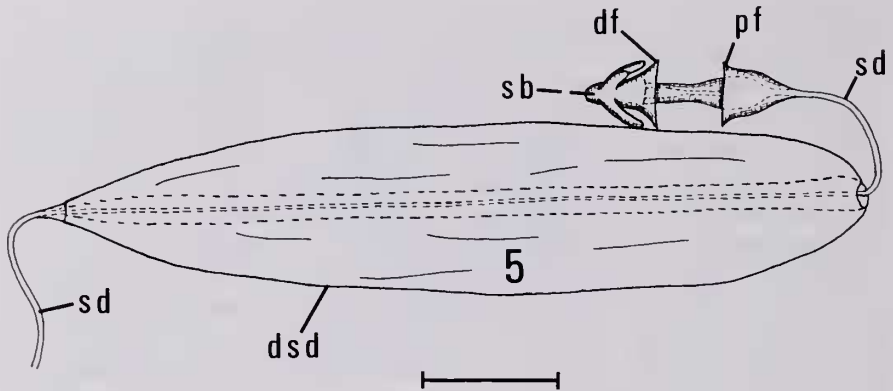


Fig. 5. *L. flavicollis*. Spermatheca and related structures; spermathecal bulb (sb), distal flange of spermathecal pump (df), proximal flange of spermathecal pump (pf), spermathecal duct (sd), dilation of spermathecal duct (dsd). Dimensional line equals 1.0 mm.

*Types*.—The type material of *Cimex flavicollis* is apparently lost. *Loxa florida* was described from Crescent City, Florida (a male) and from Biscayne Bay, Florida (a female). Blatchley (1925) and Ruckes (1952), however, cite only Crescent City as the type locality. No definite lectotype has been designated for this species so the male syntype from Crescent City is designated lectotype and the female from Biscayne Bay paralectotype. *Cimex albicollis* was proposed as a replacement name for *C. flavicollis* and as such is based on the type specimens of *C. flavicollis*.

*Distribution*.—Florida, Alabama, Bahamas, Jamaica (type locality), Cuba, Mexico, and Texas.

*Comment*.—This is a highly variable species in most of its characters, the male genitalia and female genital plates being relatively consistent, however.

#### *Loxa virescens* Amyot & Serville, 1843

*Cimex albicollis*: Herrich-Schaeffer, 1842, p. 68, fig. 634

*Loxa virescens* Amyot & Serville, 1843, pp. 137–138, tab. 3, fig. 3

*Loxa flavicollis*: Amyot & Serville, 1843, p. 137, tab. 3, fig. 3—Dallas, 1851, p. 198 (in part)—Walker, 1867, p. 241 (in part)—Walker, 1868, p. 549 (in part)—Stål, 1872, p. 36 (in part)—Uhler, 1876, p. 290 (in part)—Distant, 1880, p. 70 (in part)—Berg, 1884, p. 28—Lethierry & Severin, 1893, p. 149 (in part)—Kirkaldy, 1909, p. 96 (in part)—Horvath, 1925, pp. 319–320, tab. 4, fig. 7, tab. 5, fig. 6 (in part)—Torre-Bueno, 1939, p. 208 (in part)—Piran, 1948, p. 12—Becker & Grazia-Vieira, 1971, pp. 14–15.

*Pentatoma albicolle*: Herrich-Schaeffer, 1844, p. 94.

*Loxa affinis* Dallas, 1851, p. 198—Walker, 1867, p. 241—Stål, 1872, p. 36—Distant, 1880, p. 70, tab. 6, fig. 22—Distant, 1892, p. 336 (in part)—Lethierry & Severin, 1893, p. 149 (in part)—Distant, 1899, p. 441—Kirkaldy, 1909, p. 96 (in part)—Fennah, 1935, p. 194—Rolston, 1976, p. 3.

*Loxa invaria* Walker, 1867, p. 242—Lethierry & Severin, 1893, p. 149.

*Loxa flavicollis obtusa* Horvath, 1925, p. 320. NEW SYNONYMY.

*Loxa prasina* Horvath, 1925, p. 322, tab. 5, fig. 8. NEW SYNONYMY.

Length (exclusive of extensions of membranes beyond apex of abdomen) ♂♂ 18.7–21.4 mm, ♀♀ 19.2–24.7 mm.

Head closely resembling that of *L. flavicollis*. Antennae variable, usually possessing fine light brown to piceus line on inferior face of basal two to three segments, superior face red or tinged with red; apical two or three segments commonly with at least apical half much darker than first two segments, basal part pale; length of segments (both sexes) 1.4–2.0; 2.0–3.7; 2.0–4.8; 3.0–5.6; 1.9–4.7 mm. Width of head across eyes ♂♂ 4.2–4.9 mm, ♀♀ 4.2–5.2 mm; length ♂♂ 3.6–4.5 mm, ♀♀ 3.5–4.6 mm.

Pronotum usually with transverse fascia of pale rugae between humeri (Fig. 6). Humeral spines usually lighter than disk of pronotum, rarely red. Width of pronotum across humeri ♂♂ 12.2–16.0 mm, ♀♀ 11.5–16.0 mm; mesal length ♂♂ 4.4–5.5 mm, ♀♀ 4.2–5.8 mm.

Basal width of scutellum ♂♂ 6.8–8.1 mm, ♀♀ 6.0–8.6 mm; length at meson ♂♂ 8.4–10.3 mm, ♀♀ 7.6–10.3 mm. Coria usually each with pale discoidal spot, this being occasionally concolorous and obscure or entirely lacking; posterior margins strongly sinuous, lateral angles produced.

Legs usually concolorous with or lighter than venter; tibiae occasionally with sparse piceus markings on lateral margins of anterior face.

Breadth of first gonocoxae at widest point 1.6–2.3 mm, length from base at meson to apex 2.1–3.0 mm. Second gonocoxae 1.2–1.7 mm wide at base; 1.2–1.7 mm long at meson.

Proctiger with pair of distinct spines on posterior dorsal face (Fig. 7). Mid-ventral length of male abdominal segments 3–6: 0.8–1.1; 0.4–0.7; 0.2–0.5; 3.9–5.1 mm.

Parameres each occasionally with spine on dorsocaudal face located about midway between dorsolateral process and dorsomesal process. Each dorsomesal process with dorsal lobe rounded, not spinose. Ventromesal processes each with ventral lobe more elongate than in *L. flavicollis* (Fig. 8), this process occasionally possessing rounded to spinose projection about midway between dorsal and ventral lobes.

*Types*.—The types of *Cimex flavicollis* and *Loxa virescens* are apparently not extant. The name *L. virescens*, rather than *L. flavicollis*, is assigned to

this species on the basis of the type localities. The type locality of *L. virescens* is Surinam, that of *C. flavicollis* is Jamaica. The types of *L. affinis* (type locality Paraguay) and *L. invaria* (type locality Guyana) are both females in the British Museum (Natural History), London. The type of *L. prasina* (type locality Venezuela) is a female and the two syntypes of *L. flavicollis obtusa* (type locality unknown) are a male and a female. These three specimens are in the Akademie der Landwirtschaftswissenschaften in East Germany. Type material on which the specific names of *L. affinis*, *L. invaria*, *L. prasina* & *L. flavicollis obtusa* were based was examined.

From the syntypic specimens of *L. flavicollis obtusa* the following is designated the lectotype:

♂, labeled (a)<sup>2</sup> coll. Breddin (b) Typus, *picticornis* var. *obtusa* Horv. (c) Horvath det. (d) Typus (e) *flavicollis obtusa* Horv.

The ♀, same data as lectotype (except label (e) is lacking) is designated paralectotype.

The syntypes of *L. flavicollis obtusa* possess unusually short humeral spines, approaching those of *L. peruviansis*, but are otherwise representative of *L. virescens*.

*Distribution*.—Southern Mexico south to southern Brazil and Uruguay.

*Comment*.—Since *L. virescens* has long been considered a junior synonym of *L. flavicollis*, the literature regarding these two species is confounded. The synonymy given here has of necessity a geographical basis. Fortunately, *L. virescens* and *L. flavicollis* are narrowly sympatric, their ranges apparently overlapping only in southern Mexico.

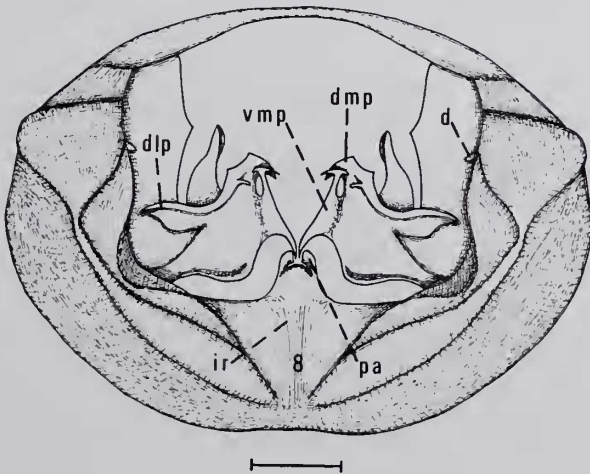
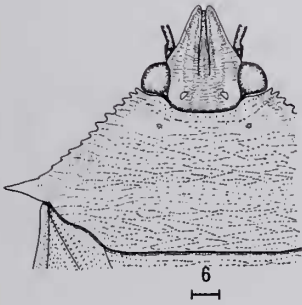
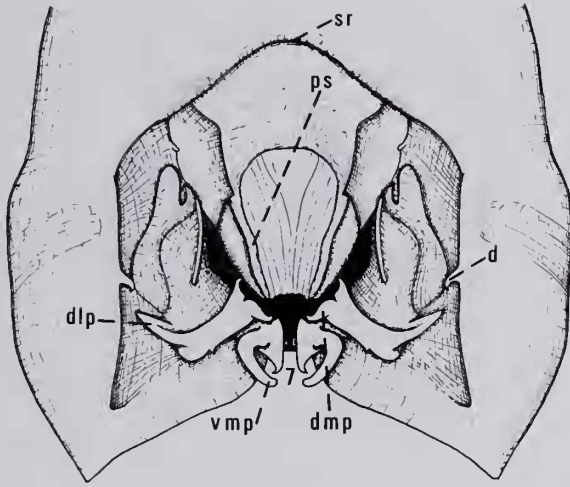
This species is very close to the preceding, being consistently different only in the structure of the male genitalia. Females usually can be distinguished by the discoidal spot on each coria, the transverse fascia of rugae on the pronotum and the antennal color. Each of these characters, however, is unreliable.

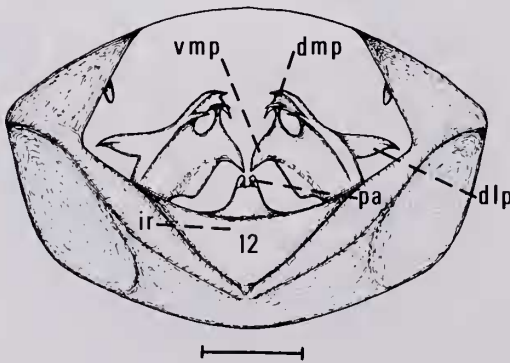
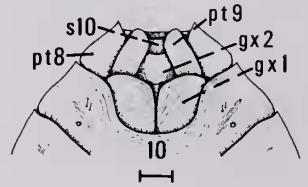
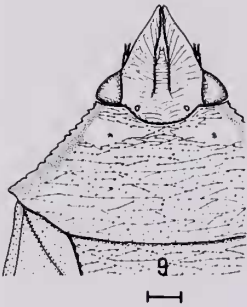
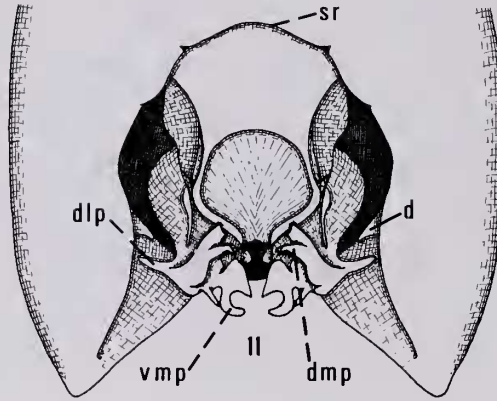
#### *Loxa peruviansis* n. sp.

Length (exclusive of extensions of membranes beyond apex of abdomen)  
♂ 15.2 mm, ♀♀ 16.8–18.3 mm.

---

Figs. 6–8. *L. virescens*. Fig. 6. Pronotum and head. Fig. 7. Genital cup, dorsal aspect; superior ridge (sr), denticle (d), proctigeral spine (ps), dorsolateral parameral process (dlp), dorsomesal parameral process (dmp), ventromesal parameral process (vmp). Fig. 8. Genital cup, caudal aspect, omitting proctiger; inferior ridge (ir), pygophoral appendage (pa). Dimensional lines equal 1.0 mm.





Lateral jugal margins usually moderately convergent for basal half, apical half strongly convergent; jugae usually each with thin submarginal band of dense punctures laterally, submarginal band of scattered punctures mesally. Antennae uniformly straw-colored, occasionally slightly darker near points of articulation. Length of segments 1.2–1.5; 1.8–2.2; 2.3–2.7; 2.6–2.8; 2.5 mm. Head slightly broader than long; width across eyes (both sexes) 3.7–4.0 mm; length 3.3–3.6 mm.

Disk of pronotum becoming most rugose between and anterior to cicatrices. Denticles of anterolateral margins punctured basally. Humeri weakly produced, broadly angular to obtuse apically (Fig. 9). Width across humeri ♂ 8.8 mm, ♀♀ 9.4–10.1 mm; length at meson ♂ 3.4 mm, ♀♀ 3.8–4.0 mm.

Scutellum transversely rugose anteriorly, less so posteriorly; scattered irregular calli usually present, especially posteriorly. Width at base ♂ 5.4 mm, ♀♀ 5.6–5.8 mm; length at meson ♂ 6.4 mm, ♀♀ 6.3–7.3 mm.

Scattered irregular pale calli on coria most dense posteriorly; discoidal spots lacking; posterior margins broadly rounded. Breadth of abdomen at widest point subequal to that of pronotum across humeri, ♂ 9.1 mm, ♀♀ 9.5–10.4 mm.

Legs concolorous with or slightly lighter than venter; apical femoral spines weakly produced, acute to narrowly angular apically.

Female genital plates smaller, but not structurally different from those of *L. flavicollis* and *L. virescens* (Fig. 10). Breadth of first gonocoxae at widest point 1.3–1.4 mm; length from base at meson to apex 1.6–1.8 mm. Basal width of second gonocoxae 1.1–1.3 mm; mesal length 0.8–1.3 mm.

Pygophore and enclosed structures very similar to *L. flavicollis*, differing as follows: *L. peruviansis* with bi-lobed apex of dorsomesal parameral processes thinner; caudal face of parameres at base of dorsomesal processes with distinct spine (Fig. 12); posterolateral margins of proctiger each lacking mesal raised area found in *L. flavicollis* (Fig. 11). Mid-ventral length of abdominal segments 3–6: 0.6; 0.4; 0.3; 4.3 mm.

*Holotype*.—Male, labeled (a) Pajjan, 4.8.67, N. Amaya C. (b) Meunprg No. 1168-68. Type no. 72137, U.S. National Museum.

*Paratypes*.—5 ♀♀: 2 ♀♀ (a) Peru, 1970 (b) Meunprg No. 567-70 (1-LHR, 1-AMNH); 1 ♀ (a) Peru: Dept. LaLibertad, Immediately N. of Trujillo. Pan

←

Figs. 9–12. *L. peruviansis*. Fig. 9. Pronotum and head. Fig. 10. Female genital plates: first gonocoxa (gx1), second gonocoxa (gx2), eighth paratergite (pt8), ninth paratergite (pt9), tenth sternite (s10). Fig. 11. Genital cup, dorsal aspect; superior ridge (sr), denticle (d), dorsolateral parameral process (dlp), dorsomesal parameral process (dmp), ventromesal parameral process (vmp). Fig. 12. Genital cup, caudal aspect, omitting proctiger: inferior ridge (ir), pygophoral appendage (pa). Dimensional lines equal 1.0 mm.

American Highway. 31.XII.1963 (b) P.C. Hutchinson and J.K. Wright Collectors (CAS); 1 ♀ (a) Peru, Ancash, Dec. 1965 (b) UA 610-67 (USNM); 1 ♀ (a) Piura, Peru (b) CHTTownsend Collector (USNM).

*Distribution.*—Peru.

*Comment.*—Easily distinguished from most of its congeners by the lack of distinct humeral spines.

*Loxa melanita* n. sp.

Length (exclusive of extensions of membranes beyond apex of abdomen) ♂ ♂ 17.9–19.4 mm, ♀ ♀ 19.4–22.8 mm.

Lateral jugal margins evenly convergent; apical and lateral margins narrowly yellow bordered, with fine piceus line on lateral face at apex and for short distance from apex; both mesal and lateral submarginal band of dense red punctures present. Narrow mesal line of red punctures present along basal half of tylus. First antennal segment reddish, second segment dull yellow, usually with red tinge; two basal segments each with fine piceus line on ventral and posterolateral surfaces, both lines extending entire length of segments; basal  $\frac{1}{2}$  to  $\frac{1}{3}$  of third segment pale, becoming piceus apically, fourth and fifth segments similarly colored, with only basal  $\frac{1}{4}$  to  $\frac{1}{5}$  pale. Length of segments (both sexes) 1.6–1.9; 2.6–3.3; 2.8–3.8; 3.6–5.1; 3.8–4.4 mm. Head slightly wider across eyes than long, ♂ ♂ 4.1–4.5 mm wide, 3.6–4.0 mm long; ♀ ♀ 4.2–4.7 mm wide, 3.4–4.2 mm long.

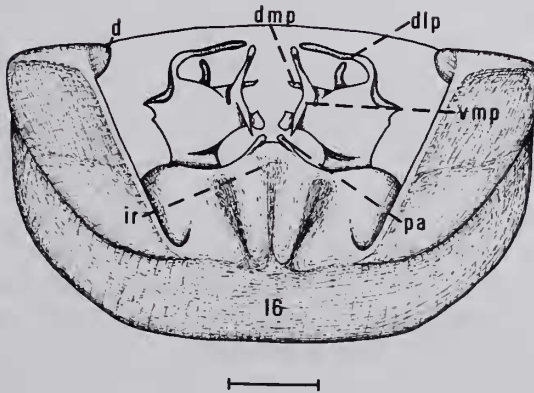
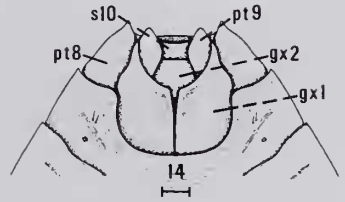
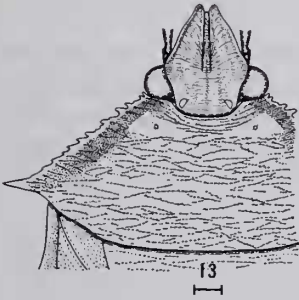
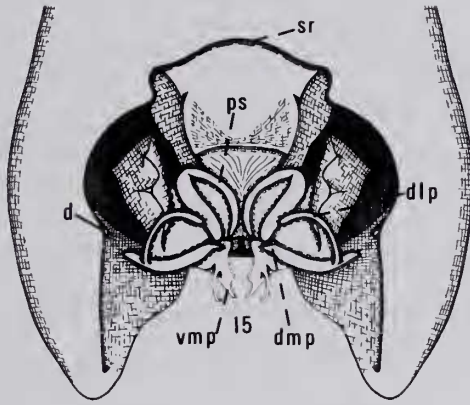
Anterolateral margins of pronotum nearly straight, varying from slightly lighter green than disk to bright yellow-orange. Humeri strongly produced into spines, slightly elevated, lighter in color than remainder of pronotum, sometimes connected by fascia of weak discontinuous rugae. Pronotal width across humeri ♂ ♂ 12.1–14.8 mm, ♀ ♀ 12.7–15.0 mm; length at meson ♂ ♂ 4.3–5.0 mm, ♀ ♀ 4.2–5.1 mm.

Breadth of scutellum at base ♂ ♂ 6.1–7.7 mm, ♀ ♀ 6.3–7.4 mm; length at meson ♂ ♂ 7.8–8.9 mm, ♀ ♀ 7.6–9.4 mm. Coria each with one large pale discoidal spot; scattered irregular pale calli present; posterior margins strongly sinuous, lateral angles produced.

Legs light green to greenish-brown; apical femoral spines moderately pro-

→

Figs. 13–16. *L. melanita*. Fig. 13. Pronotum and head. Fig. 14. Female genital plates: first gonocoxa (gx1), second gonocoxa (gx2), eighth paratergite (pt8), ninth paratergite (pt9), tenth sternite (s10). Fig. 15. Genital cup, dorsal aspect; superior ridge (sr), denticle (d), proctigeral spine (ps), dorsolateral parameral process (dlp), dorsomesal parameral process (dmp), ventromesal parameral process (vmp). Fig. 16. Genital cup, caudal aspect, omitting proctiger; inferior ridge (ir), pygophoral appendage (pa). Dimensional lines equal 1.0 mm.





duced; apex of fore, mid and, occasionally, hind femora tipped with piceus; fore and mid tibiae with lateral and mesal borders of superior face each possessing piceus line, darkest at both extremes, evanescent toward middle of tibiae.

First gonocoxae each strongly and acutely produced posteriorly (Fig. 14), extending for more than half of length of ninth paratergites; breadth at widest point 1.6–2.2 mm, length from base at mesal margin to apex 2.8–4.2 mm. Second gonocoxae with thin obscure to distinct longitudinal concavity along meson; slightly broader than long; 1.2–1.6 mm wide at base, 1.0–1.3 mm long at meson.

Denticles on each inner dorsolateral margin of genital cup small and obtuse. Superior ridge shallowly emarginate mesally, sinuate. Sides of pygophore caudad of parameres thin, strongly compressed. Caudal third of proctiger with two distinct strongly recurved spines lying flush with proctigeral surface (Fig. 15). Pygophoral appendages without caudal hooks. Ventral length of male segments 3–6 at meson 0.7–0.8; 0.3–0.4; 0.2–0.3; 4.3–4.8 mm.

Parameres with several distinctive processes. Each dorsolateral process elongate, recurved from dorsal view, obtuse apically. Dorsomesal processes each acute, curving dorsad at apex. Each ventromesal process bi-lobed; dorsal lobes each obtuse apically and strongly recurved from lateral aspect; ventral lobes each sharply acute apically, slightly curved laterad from caudal view (Figs. 15, 16).

*Holotype*.—Male, labeled (a) Brazil, Mato Grosso: Lat. 12° 31' & Long. 55° 37', Sinop, October, 1974, M. Alvarenga. Deposited in the American Museum of Natural History.

*Paratypes*.—5♂♂ and 14♀♀: 2♂♂ and 5♀♀ same data as holotype (1♂ BMNH, 1♀ Museu Nacional, Brazil, 1♂ and 4♀♀ AMNH); 1♂ and 2♀♀ (a) Brazil, Mato Grosso: Vila Vera, 55° 30' long., 12° 46' lat., Oct., 1973, M. Alvarenga (1♀ LHR, 1♂ and 1♀ AMNH); 1♀ (a) Brazil: Para Jacareacanga, Dec., 1968, M. Alvarenga (AMNH); 1♂ and 1♀ (a) Tingo Maria, Rio Huallaga (b) WKW 758, Peru, 670 m., XII.46, W. Weyrauch (AMNH); 1♀ (a) Tingo Maria, Huan., Peru, Jan. 20, 194-, Alt. 2200 ft. (b) J.C. Pallister Coll. Donor Frank Johnson (c) *Loxa* sp. nov. (AMNH); 1♀ (a) Peru: Monson Valley, Tingo Maria, XII-18-1954 (b) E.I. Schlinger & E.S. Ross collectors (CAS); 1♀ (a) Peru, S. Amer. Cucharas, Vall. of Riv. Huallaga, 500 mtrs. A.S.L. (b) Dept. Huanuco, II.16.1954, F. Woytkowski (c) J.C. Lutz Collection, 1961 (USNM); 1♀ Santipo, Peru, IV.15.1941, P. Paprzycki (b) 38 (c) J.C. Lutz Collection, 1961 (USNM); 1♂ Tingo Maria, Peru, I.1950, H.A. Allard (USNM); 1♀ (a) Upper Mazaruni R., Br. Guiana, IX-X, 1938 (b) Coll. A.S. Pinkus (c) *Loxa* sp. nov. Ruckes (AMNH).

*Distribution*.—Brazil, Peru, Guyana.

*Comment*.—This species is, in general, darker in overall coloration and possesses more black or piceus markings than its congeners. From them it is easily distinguished by the remarkably elongate parameral processes and by the shape of the first gonocoxae.

*Loxa deducta* Walker, 1867

*Loxa deducta* Walker, 1867, pp. 242–243—Lethierry & Severin, 1893, p. 149 (synonymy, distribution)—Van Duzee, 1901, p. 344 (distribution)—Horvath, 1925, p. 321, tab. 4, fig. 8, tab. 5, fig. 7—Buckup, 1961, p. 11 (distribution)—Rolston, 1976, p. 4.

Length (exclusive of extensions of membranes beyond apex of abdomen) ♂♂ 13.3–16.3 mm, ♀♀ 16.3–19.4 mm.

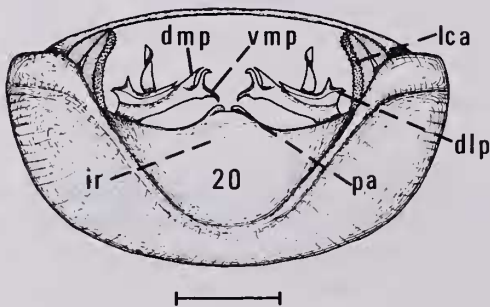
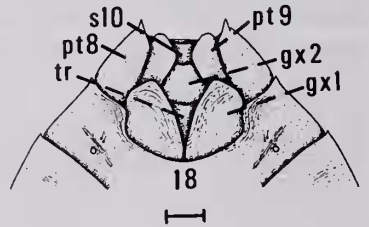
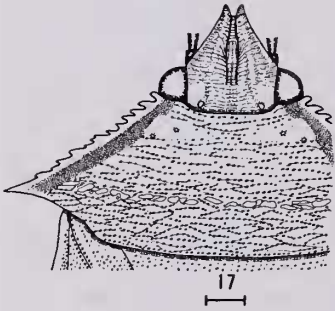
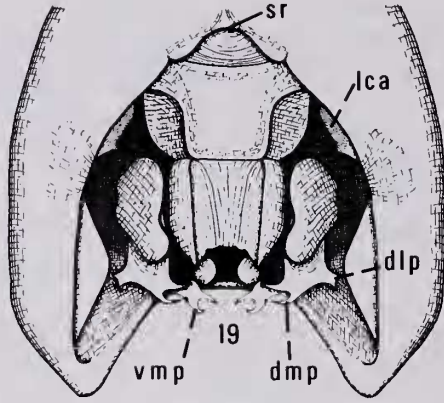
Disk of head with scattered punctures usually concentrated in mesal longitudinal band. Jugae with both mesal and lateral submarginal band of dense red punctures, these occasionally concolorous in mesal band; lateral margins slightly undulating; lateral face at apex and for short distance from apex occasionally with fine piceus line. Tylus with mesal band of usually red punctures on approximately basal half, punctures on apical half scattered. Antennae lighter than head or concolorous with it, occasionally tinged with red; length of segments (both sexes) 1.2–1.4; 1.8–2.4; 2.1–2.6; 2.4–3.2; 2.4–2.8 mm. Width of head across eyes ♂♂ 3.3–3.8 mm, ♀♀ 3.4–3.9 mm; length ♂♂ 2.8–3.3 mm, ♀♀ 2.8–3.4 mm.

Disk of pronotum traversed between humeri by fascia of usually pale rugae. Anterolateral margins nearly straight, paler than or concolorous with disk. Humeri strongly produced into elevated spines, projecting laterad to slightly cephalad (Fig. 17). Width of pronotum across humeri ♂♂ 10.2–12.6 mm, ♀♀ 11.2–13.1; length at meson ♂♂ 3.4–4.2 mm, ♀♀ 3.3–4.2 mm.

Scutellum with scattered irregular, usually pale, calli; basal breadth ♂♂ 4.7–6.0 mm, ♀♀ 4.7–6.0 mm; length at meson ♂♂ 5.7–7.6 mm, ♀♀ 6.6–7.6 mm. Coria with numerous scattered pale calli; discoidal spots lacking; posterior margins slightly sinuous to broadly rounded, lateral angles not produced.

Legs nearly concolorous with venter; apical femoral spines moderately produced.

Mesal margins of first gonocoxae widely divergent from base to apex, distinctly exposing triangulum; posterior margins broadly rounded (Fig. 18); maximum width 1.2–1.7 mm; length from base at meson to apex 1.7–2.2 mm. Second gonocoxae slightly broader at base than long at meson, 1.0–1.3:0.9–1.2 mm, usually with shallow longitudinal sulcus mesally.



Denticles lacking on inner dorsolateral margins of genital cup. Pygophore with posterior margin deeply concave, sides caudad of parameres broad, slightly compressed. Superior ridge deeply emarginate; lateral carina distinctly spiculate. Mesal wall of inferior ridge strongly angled dorsocaudad from below. Pygophoral appendages lacking caudal hooks. Proctiger subquadrate, quadrately emarginated posteriorly; caudolateral margin appearing somewhat spinose (Fig. 19). Mid-ventral length of abdominal segments 3–6, 0.6–0.7; 0.2–0.6; 0.1–0.2; 3.8–4.7 mm.

Caudal face of parameres transversely elongate, each with dorsomesal spine. Dorsolateral processes each bi-lobed from dorsal aspect, both lobes spinose; one projecting cephalad, one mesad. Each ventromesal process also bi-lobed; dorsal lobe strongly recurved caudally, apex acute, slightly turned mesad; ventral lobe broad basally, acute apically, projecting ventromesad, curving ventrad at apex (Fig. 20).

*Type*.—Female in the British Museum (Natural History), London. Type examined.

*Distribution*.—Panama, Venezuela, Bolivia, Brazil (type locality), Uruguay, Paraguay, Argentina.

*Comment*.—This is a very distinctive species, easily distinguished by the shape of the parameres and proctiger, by the spiculate lateral carina of the genital cup, and by the divergent first gonocoxae of females.

*Loxa viridis* (Palisot de Beauvois, 1805)

*Pentatoma viridis* Palisot de Beauvois, 1805, p. 111, pl. Hemip. 8, fig. 1.

*Loxa viridis*: Dallas, 1851, p. 198 (placed in synonymy of *flavicollis*)—Horvath, 1925, p. 311, tab. 4, fig. 1, tab 5, fig 1.

*Loxa picticornis* Horvath, 1925, pp. 312–313, tab. 4, fig. 2, tab. 5, fig. 2—Buckup, 1961, p. 11 (distribution)—Becker & Grazia-Vieira, 1971, p. 58 (distribution). NEW SYNONYMY.

*Loxa scutellaris* Horvath, 1925, pp. 313. NEW SYNONYMY.

*Loxa vicina* Horvath, 1925, pp. 313–314, tab. 5, fig. 3. NEW SYNONYMY.

*Loxa exsul* Horvath, 1925, pp. 314–315, tab. 4, fig. 3. NEW SYNONYMY.

---

←

Figs. 17–20. *L. deducta*. Fig. 17. Pronotum and head. Fig. 18. Female genital plates: first gonocoxa (gx1), second gonocoxa (gx2), eighth paratergite (pt8), ninth paratergite (pt9), tenth sternum (s10), triangulum (tr). Fig. 19. Genital cup, dorsal aspect; superior ridge (sr), lateral carina (lca), dorsolateral parameral process (dlp), dorsomesal parameral process (dmp), ventromesal parameral process (vmp). Fig. 20. Genital cup, caudal aspect, omitting proctiger; inferior ridge (ir), pygophoral appendage (pa). Dimensional lines equal 1.0 mm.

*Loxa columbiae* Horvath, 1925, pp. 315–316, tab. 4, fig. 4—Becker & Grazia-Vieira, 1971, p. 14 (distribution). NEW SYNONYMY.

*Loxa assimilis* Horvath, 1925, p. 316, tab. 4, fig. 5. NEW SYNONYMY.

*Loxa orthacantha* Horvath, 1925, pp. 317–318, tab. 5, fig. 4—Pirán, 1968, p. 21, pl. 1, fig. C (distribution). NEW SYNONYMY.

*Loxa pilipes* Horvath, 1925, pp. 318–319, tab. 5, fig. 5—Barber, 1939, p. 249 (keyed, synonymy)—Bruner & Barber, 1949, p. 159 (distribution)—Ruckes, 1952, pp. 6–7 (synonymy, distribution)—Alayo, 1967, pp. 21, 23 (synonymy, keyed, distribution). NEW SYNONYMY.

Length (exclusive of extensions of membranes beyond apex of abdomen) ♂♂ 18.3–25.5 mm; ♀♀ 18.9–25.3 mm.

Lateral margins of jugae undulating, normally becoming divergent at apex, usually lighter in color than disk of head; each with submarginal band of dense concolorous to red punctures along lateral and mesal margins. Lateral margins of tylus each with submarginal line of dense, usually red, punctures. Antennae highly variable in color, from almost entirely pale to dark, mostly possessing some red coloration and at least one fine brown to piceus line on two basal segments; apical three segments commonly darker at apex than at base; length of segments (both sexes) 1.2–2.0; 1.9–3.2; 2.2–4.7; 2.6–4.6; 2.1–4.0 mm. Width of head across eyes ♂♂ 3.7–4.8 mm, ♀♀ 3.7–4.7 mm; length ♂♂ 3.4–4.4 mm, ♀♀ 3.3–4.5 mm.

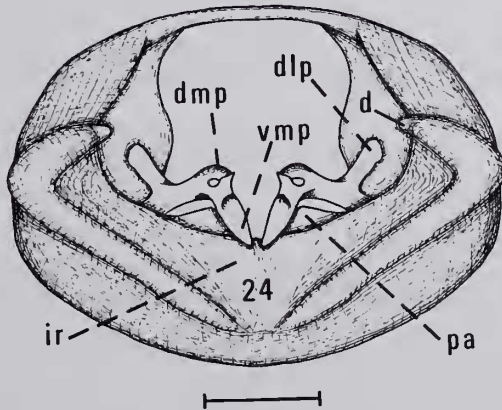
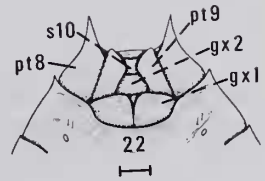
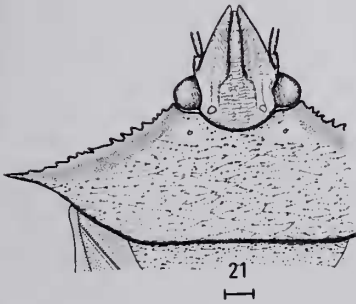
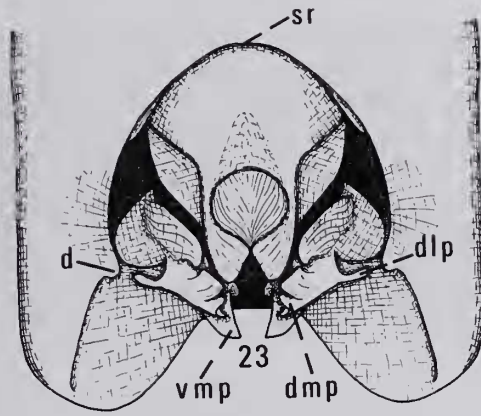
Rugae of pronotum occasionally forming transverse fascia between humeri. Anterolateral margins usually lighter than disk. Humeri strongly produced into acute spines, moderately to strongly elevated, directed laterad or laterocephalad (Fig. 21), usually concolorous with anterolateral margins or red. Width of pronotum across humeri ♂♂ 13.8–19.4 mm, ♀♀ 13.3–18.7 mm; length at meson ♂♂ 4.2–5.7 mm, ♀♀ 4.1–5.9 mm.

Scutellum frequently with numerous scattered irregular calli, these concolorous to pale; width at base ♂♂ 5.9–8.6 mm, ♀♀ 6.0–8.3 mm; mesal length ♂♂ 7.3–10.2 mm, ♀♀ 6.5–9.7 mm. Coria normally with scattered irregular pale calli; large discoidal spots present or absent; posterior margins strongly sinuous, lateral angles produced.

Legs varying from almost entirely light brown or light green to much darker, bearing some red coloration and frequently piceus markings at apex

→

Figs. 21–24. *L. viridis*. Fig. 21. Pronotum and head. Fig. 22. Female genital plates: first gonocoxa (gx1), second gonocoxa (gx2), eighth paratergite (pt8), ninth paratergite (pt9), tenth sternite (s10). Fig. 23. Genital cup, dorsal aspect; superior ridge (sr), denticle (d), dorsolateral parameral process (dlp), dorsomesal parameral process (dmp), ventromesal parameral process (vmp). Fig. 24. Genital cup, caudal aspect, omitting proctiger; inferior ridge (ir), pygophoral appendage (pa). Dimensional lines equal 1.0 mm.



of femora and at base and apex of tibia; apical femoral spines strongly produced.

First gonocoxae nearly contiguous to slightly divergent for much of length along mesal margins, apex of mesal margin rounded; posterior margins nearly straight transversely, slightly undulating (Fig. 22); breadth at widest point 1.1–1.7 mm; length from base at meson to apex 1.0–1.4 mm. Second gonocoxae 0.9–1.3 mm wide at base, 0.5–0.8 mm long at meson.

Superior ridge of genital cup broadly emarginate mesally; denticle on each inner dorsolateral margin of genital cup broadly rounded; sides of pygophore caudad of parameres slightly compressed. Pygophoral appendages lacking distinct hooks. Proctiger lacking distinct spines on dorsal face (Fig. 23). Mid-ventral length of abdominal segments 3–6: 1.0–1.7; 0.7–1.6; 0.3–1.0; 3.7–5.5 mm.

Parameres (Fig. 24) with each dorsolateral process subquadrate, somewhat thinner at base than at apex. Dorsomesal processes broad; each projecting mesad, slightly curving ventrad; apex broadly rounded. Each ventromesal process tri-lobed; ventral lobe projecting ventromesad, rounded to narrowly obtuse apically; dorsal lobe somewhat subtriangular from mesal aspect with point which projects cephalad thinner and more elongate than other two; mesal lobe flattened in mesal aspect, rounded apically.

*Types*.—The type specimens of *Pentatoma viridis*, *Loxa vicina*, *L. orthacantha* and *L. pilipes* are all apparently lost. The holotype of *L. assimilis*, a male, in the Naturhistorisches Museum Wien was kindly compared to a determined specimen of *L. viridis* and drawn for me by Dr. A. Kaltenbach. Holotypes for the following species are in the Akademie der Landwirtschaftswissenschaften: *L. columbiae*, a male; *L. exsul*, a male; *L. scutellaris*, a female. These types were examined.

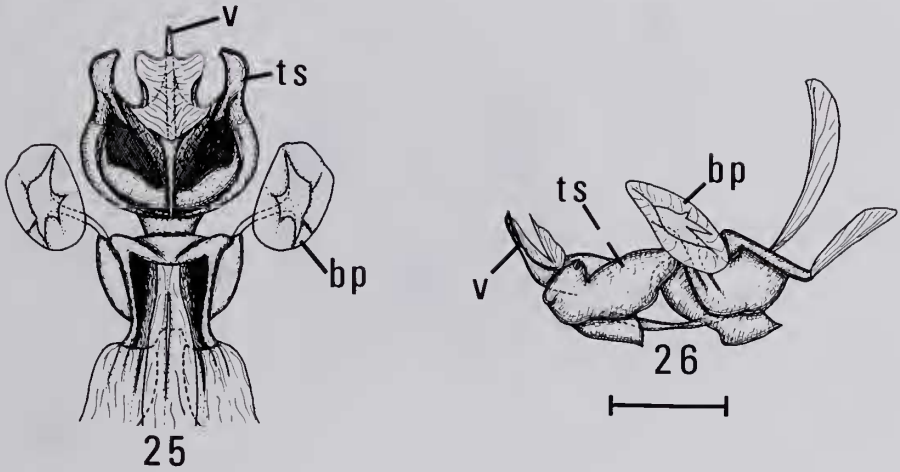
The syntypes of *L. picticornis* are in the following institutions: Akademie der Landwirtschaftswissenschaften; Magyar Nemzeti Muzem Allattara; Naturhistorisches Museum Wien. The entire syntype series for *L. picticornis* was not examined; therefore, a lectotype only is designated as follows:

♂, labeled (a) Porto do Cadi (b) F. Hoffmann coll., Arp dedic. 1921 (c) *Loxa picticornis* Horvath (d) Holotypus. (Magyar Nemzeti Muzem Allattara).

Apparently Horvath intended this specimen to be the holotype, although he did not indicate this in his publication. There is also the possibility that this label was added subsequent to Horvath's revision.

*Distribution*.—Southern Texas and Florida south to southern Brazil and Argentina.

*Comment*.—This species is the most widespread of the genus and the most



Figs. 25–26. *L. viridis*. Fig. 25. Theca and related structures, dorsal aspect; vesica (v), thecal sheath (ts), basal plate (bp). Fig. 26. Theca and related structures, lateral aspect. Dimensional lines equal 1.0 mm.

variable, but the male genitalia and female genital plates are relatively consistent throughout. Variability appears to be somewhat geographically correlated, but the examination of a large series shows the intergradation of the different geographical forms.

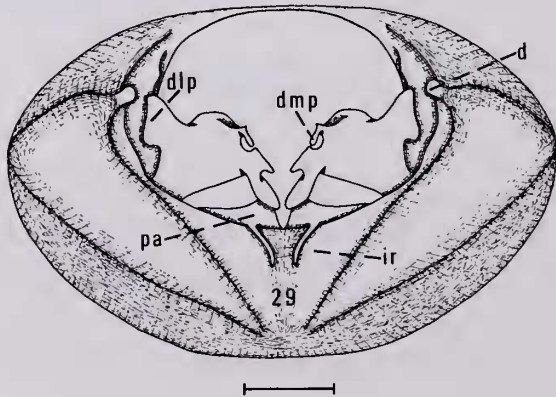
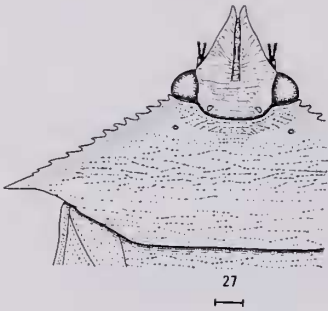
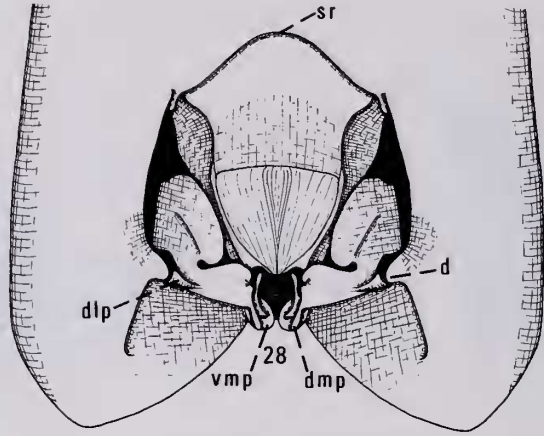
The pygophore and enclosed structures are similar to those of *L. nesiotus*, *L. pallida*, *L. parapallida* and *L. planiceps*. From these four species, *L. viridis* is especially distinguished by the absence of caudal hooks on the pygophoral appendages. The first gonocoxae resemble only those of *L. pallida* (the female of *L. parapallida* being unknown), but females of *L. viridis* can be distinguished from *L. pallida* by the absence of numerous dense calli on the dorsum (which are normally present in *L. pallida*), and by the sinuous posterior margins of the coria (which are broadly rounded in *L. pallida*).

#### *Loxa parapallida* n. sp.

Length (exclusive of extensions of membranes beyond apex of abdomen) ♂ 18.9 mm.

Disk of head moderately punctured with red. Lateral margins of jugae yellow, undulating, divergent at apex; three bands of red punctures present on each jugum; one marginal laterally, one submarginal along mesal margins and continuing onto vertex of head, one parallel to and laterad of submarginal band and terminating at ocellus. Tylus with submarginal line of red punctures along each lateral margin. Antennae light brown, two basal seg-





ments with fine brown line on inferior face; length of segments ♂ 1.5; 2.2; 3.2; 3.1; 2.8 mm. Width of head across eyes ♂ 4.2 mm; length ♂ 3.9 mm.

Pronotum without pale calli; anterolateral margins yellow, submarginal band of punctures dense. Humeri strongly produced into spines, projecting slightly caudad, moderately elevated (Fig. 27). Width of pronotum across humeri ♂ 15.7 mm; length at meson ♂ 4.7 mm.

Basal breadth of scutellum ♂ 7.0 mm; length at meson ♂ 8.2 mm. Irregular pale calli scattered on coria; each corium with pale discoidal spot, sinuous posterior margin, slightly produced lateral angle.

Legs light brown to green; apical femoral spines strongly produced.

Pygophore and enclosed structures very similar to *L. pallida* (Figs. 28, 29), with the following differences: lateral margins of dorsolateral parameral processes each shallowly concave (convex in *L. pallida*); mesal face of each ventromesal process deeply emarginate (less prominently so in *L. pallida*); pygophoral appendages projecting ventromesad, curving ventrad (projecting ventrad, curving laterad in *L. pallida*). Mid-ventral length of segments 3–6: 0.8; 0.4; 0.3; 4.2 mm.

*Holotype*.—Male, labeled (a) Achinamiza, Peru, VIII-28-27, F. 6001 (b) H. Bassler Collection, Acc. 33591. Deposited in the American Museum of Natural History. No paratypes.

*Distribution*.—Peru.

*Comment*.—The male genitalia are very close to *L. pallida*, but *L. parapallida* is larger and differs in the form of the parameres. In overall size and shape, and in the structure of most of the male genitalia this species is similar to *L. viridis*, but is easily distinguished by the presence of caudal hooks on the pygophoral appendages which are absent in *L. viridis*. The female of this species is unknown.

The punctuation of the jugae, apparently diagnostic, may prove variable within the species.

#### *Loxa pallida* Van Duzee, 1907

*Loxa pallida* Van Duzee, 1907, pp. 9–10—Kirkaldy, 1909, p. 197 (synonymy)—Horvath, 1925, p. 317, tab. 4, fig. 6—Barber & Bruner, 1932, pp.

---

←

Figs. 27–29. *L. parapallida*. Fig. 27. Pronotum and head. Fig. 28. Genital cup, dorsal aspect; superior ridge (sr), denticle (d), dorsolateral parameral process (dlp), dorsomesal parameral process (dmp), ventromesal parameral process (vmp). Figs. 29. Genital cup, caudal aspect, omitting proctiger; inferior ridge (ir), pygophoral appendages (pa). Dimensional lines equal 1.0 mm.

259–260—Bruner & Barber, 1949, p. 159 (distribution)—Alayo, 1967, pp. 22–23, pl. 4, fig. 1 (synonymy, keyed).

*Loxa planifrons* Barber & Bruner, 1932, p. 260, pl. 25, fig. 7—Wolcott, 1936, p. 177—Barber, 1939, p. 294 (synonymy, keyed)—Bruner & Barber, 1949, p. 159—Wolcott, 1950, p. 192—Alayo, 1967, p. 23 (synonymy, keyed). NEW SYNONYMY.

Length (exclusive of extensions of membranes beyond apex of abdomen) ♂♂ 16.9–19.0 mm; ♀♀ 17.4–21.1 mm.

Head with sparse concolorous punctures, scattered pale areas. Lateral margins of jugae concolorous with disk to pale, nearly straight, divergent apically. Antennae uniformly colored, slightly lighter than dorsum, occasionally apical two segments darker or more yellowish. Length of segments (both sexes) 1.2–1.4; 2.0–2.4; 1.9–2.7; 2.3–2.7; 2.2–2.7 mm. Head slightly broader than long; width across eyes ♂♂ 3.5–4.0 mm, ♀♀ 3.6–4.2 mm; length ♂♂ 3.3–3.7 mm, ♀♀ 3.2–3.7 mm.

Pronotum bearing numerous fine transverse pale calli. Anterolateral margins light yellow in green specimens. Humeral spines strongly produced, acute, moderately to strongly elevated (Fig. 30). Width across humeri ♂♂ 11.7–15.3 mm, ♀♀ 12.1–14.5 mm; length at meson (both sexes) 3.7–4.8 mm.

Scutellum longer than broad; basal width ♂♂ 5.6–7.0 mm, ♀♀ 5.7–7.0 mm; mesal length ♂♂ 7.2–8.2 mm, ♀♀ 7.2–7.9 mm; calli numerous, pale, transverse. Punctuation of lateral submarginal band on each corium hardly more dense than that of disk; numerous irregular calli present; discoidal spot absent; posterior margins broadly rounded.

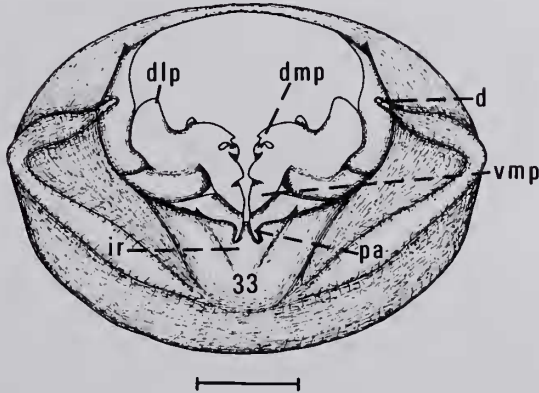
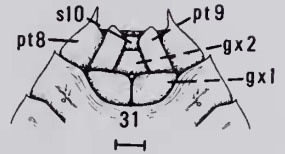
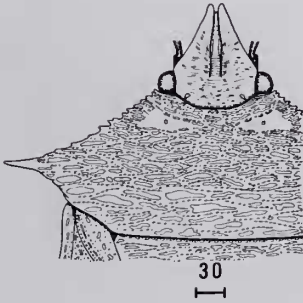
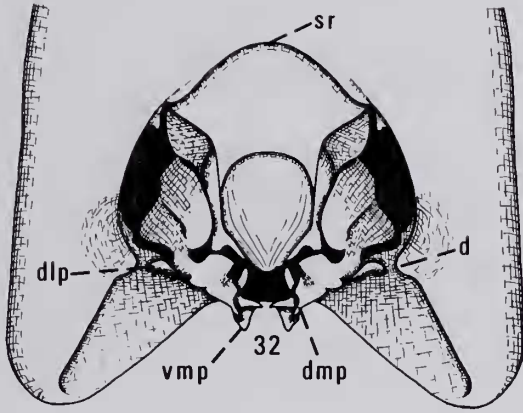
Legs pale, nearly concolorous with venter; apical femoral spines strongly produced.

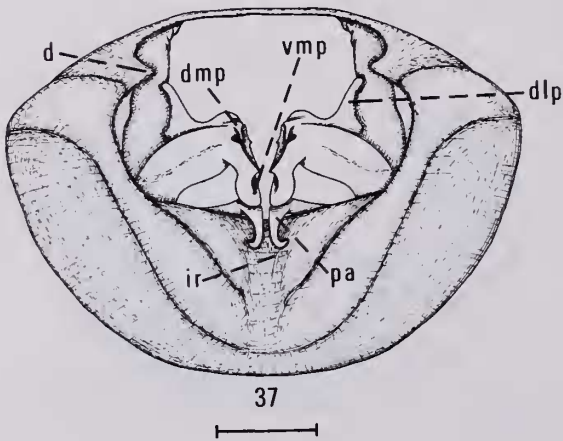
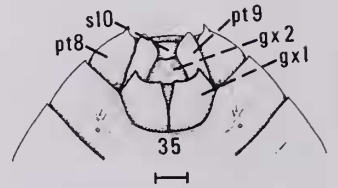
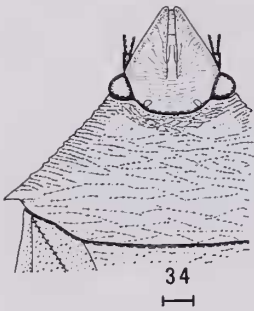
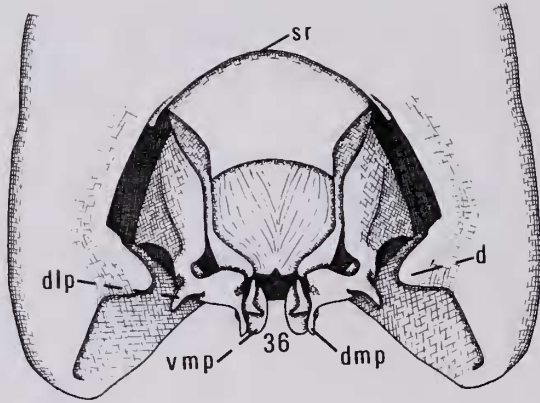
Mesal margins of first gonocoxae contiguous for most of their length, rounded apically; posterior margins nearly straight, slightly angled caudad from mesal margins (Fig. 31). Breadth of each first gonocoxa at widest point 1.3–1.4 mm; length from base at meson to apex 1.2–1.3 mm. Breadth of second gonocoxae at base 1.1–1.3 mm; mesal length 0.6–0.8 mm.

Denticle on each dorsolateral inner margin of genital cup rounded. Superior ridge moderately emarginate. Pygophoral appendages with small slightly recurved hooks. Proctiger simple, without spines on dorsal face

→

Figs. 30–33. *L. pallida*. Fig. 30. Pronotum and head. Fig. 31. Female genital plates; first gonocoxa (gx1), second gonocoxa (gx2), eighth paratergite (pt8), ninth paratergite (pt9), tenth sternite (s10). Fig. 32. Genital cup, dorsal aspect; superior ridge (sr), denticle (d), dorsolateral parameral process (dlp), dorsomesal parameral process (dmp), ventromesal parameral process (vmp). Fig. 33. Genital cup, caudal aspect, omitting proctiger; inferior ridge (ir), pygophoral appendage (pa). Dimensional lines equal 1.0 mm.





(Fig. 32). Mid-ventral length of segments 3–6: 0.8–1.0; 0.5–0.6; 0.2–0.4; 3.8–4.7 mm.

Dorsolateral processes of parameres broad basally; rounded apically. Dorsomesal processes small and thin. Ventromesal processes rounded apically (Fig. 33).

*Types*.—The holotype of *Loxa pallida* Van Duzee, a female, in the California Academy of Sciences, was examined. The paratypes of *L. planifrons* Barber & Bruner in the U.S. National Museum (a male and two females) and in the American Museum of Natural History (a female) were examined.

*Distribution*.—Cuba, Dominican Republic, Bahamas, Puerto Rico and Jamaica (type locality).

*Comment*.—Easily distinguished from its congeners by the numerous pale dorsal calli.

*Loxa planiceps* Horvath, 1925

*Loxa planiceps* Horvath, 1925, pp. 323–324, tab. 5, fig. 10.

Length (exclusive of extensions of membranes beyond apex of abdomen) ♂ 17.2 mm, ♀♀ 17.7 mm.

Disk of head finely punctured with red. Lateral jugal margins nearly straight, yellow, with thin submarginal band of red punctures. First and second antennal segments light red; basal segment with fine piceus line beneath; third and fourth segments straw-colored, becoming red at base and apex; apical segment entirely straw-colored. Length of segments (both sexes) 1.4–1.6; 2.2–2.4; 2.6–3.1; 2.4–2.7; 2.4–2.6 mm. Width of head across eyes ♂ 3.9 mm, ♀♀ 3.8–4.2 mm; length ♂ 3.2 mm, ♀♀ 3.3–3.6 mm.

Pronotum becoming more rugose before cicatrices. Anterolateral margins denticulate, much lighter green than disk. Humeri moderately produced into spines (Fig. 34), red tinged, strongly angled rearward, slightly elevated. Width of pronotum across humeri ♂ 10.6 mm, ♀♀ 10.3–11.4 mm, length at meson ♂ 3.7 mm, ♀♀ 3.8–4.3 mm.

Breadth of scutellum at base ♂ 6.1 mm, ♀♀ 6.1–6.7 mm; length at meson ♂ 7.7 mm, ♀♀ 7.2–8.1 mm. Submarginal band of punctures on each corium

←

Figs. 34–37. *L. planiceps*. Fig. 34. Pronotum and head. Fig. 35. Female genital plates; first gonocoxa (gx1), second gonocoxa (gx2), eighth paratergite (pt8), ninth paratergite (pt9), tenth sternite (s10). Fig. 36. Genital cup, dorsal aspect; superior ridge (sr), denticle (d), dorsolateral parameral process (dlp), dorsomesal parameral process (dmp), ventromesal parameral process (vmp). Fig. 37. Genital cup, caudal view, omitting proctiger; inferior ridge (ir), pygophoral appendage (pa). Dimensional lines equal 1.0 mm.

weak, irregularly discontinuous; disk with scattered pale calli; discoidal spots lacking; posterior margins weakly sinuous to broadly rounded. Breadth of abdomen at widest point subequal to width of pronotum across humeri ♂ 10.7 mm, ♀♀ 10.2–11.2 mm.

Legs light greenish-brown, apical femoral spines moderately produced.

First gonocoxae concolorously punctured; mesal margins divergent for caudal half; each posterior margin concave, acutely produced at postero-lateral angle which overlaps ninth paratergite (Fig. 35); breadth at widest point 1.4–1.5 mm. Second gonocoxae with one mesal and two lateral longitudinal concavities, much broader at base than long at meson, 1.2–1.4:0.8–0.9 mm.

Dorsal margins of genital cup diverging posteriorly, each with large obtuse denticle slightly caudad of meson. Sides of pygophore broad, not strongly compressed. Superior ridge shallowly emarginate mesally. Proctiger simple, lacking distinct spines on dorsal face (Fig. 36). Pygophoral appendages with well developed recurved caudal hooks overlapping mesal wall of inferior ridge (Fig. 37). Mid-ventral length of male abdominal segments 3–6: 0.6; 0.4; 0.2; 4.3 mm.

Lateral face and margin of each dorsolateral parameral process spiculate; apex obtuse, curved laterally and posteriorly from caudal aspect. Dorsomesal processes each protruding rearward, slightly twisted, obtuse at apex. Ventromesal processes each broadly rounded apically.

*Type*.—Apparently lost.

*Distribution*.—Dominica, Guadeloupe (type locality).

*Comment*.—Closely allied to *L. nesiotus* in the structure of the male genitalia and the first gonocoxae of the females, but easily distinguished by the curvature of the humeral spines. Although Horvath's type is apparently lost, the five specimens examined agree closely with his description and the distribution given by him.

#### *Loxa nesiotus* Horvath, 1925

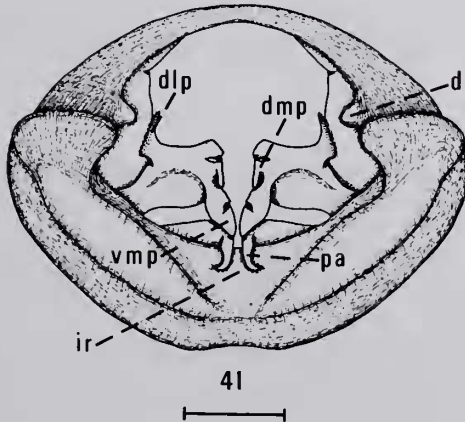
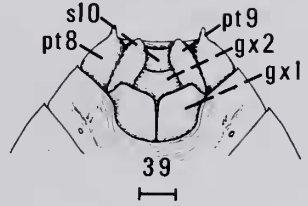
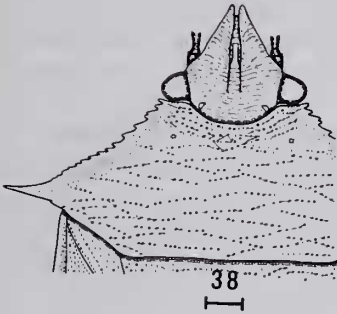
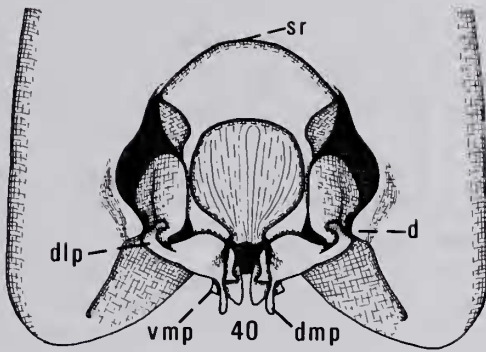
*Loxa nesiotus* Horvath, 1925, pp. 322–323, tab. 5, fig. 9.

Length (exclusive of extensions of membranes beyond apex of abdomen) ♂♂ 14.3–16.2 mm, ♀♀ 15.5–18.5 mm.

→

---

Figs. 38–41. *L. nesiotus*. Fig. 38. Pronotum and head. Fig. 39. Female genital plates: first gonocoxa (gx1), second gonocoxa (gx2), eighth paratergite (pt8), ninth paratergite (pt9), tenth sternite (s10). Fig. 40. Genital cup, dorsal aspect; superior ridge (sr), denticle (d), dorsolateral parameral process (dlp), dorsomesal parameral process (dmp), ventromesal parameral process (vmp). Fig. 41. Genital cup, caudal aspect, omitting proctiger; inferior ridge (ir), pygophoral appendage (pa). Dimensional lines equal 1.0 mm.





Jugae each with thin distinct submarginal band of punctures laterally; fine broken band of sparse punctures mesally; mesal margins widely separated to nearly contiguous subapically; lateral margins lightly undulating, usually divergent near apex, slightly to distinctly paler than remainder of jugae. Tylus with lateral line of sparse punctures along each lateral margin. Antennae entirely light green to straw-colored, occasionally two basal segments red at extremities. Length of segments (both sexes) 0.9–1.4; 1.7–2.2; 1.9–2.5; 2.3–3.1; 2.2–2.5 mm. Width of head across eyes ♂♂ 3.4–3.7 mm, ♀♀ 3.5–3.8 mm; length ♂♂ 2.8–3.2 mm, ♀♀ 2.8–3.4 mm.

Pronotum becoming somewhat more rugose before cicatrices. Anterolateral margins nearly straight (Fig. 35), paler than disk. Humeri strongly produced into acute spines, protruding laterad to slightly cephalad, moderately to strongly elevated. Pronotal width with humeri ♂♂ 9.8–12.2 mm, ♀♀ 9.9–13.0 mm; length at meson ♂♂ 3.4–3.9 mm, ♀♀ 3.5–4.1 mm.

Scutellum rugose anteriorly; breadth at base ♂♂ 5.0–5.9 mm, ♀♀ 5.4–6.3 mm; mesal length ♂♂ 6.3–7.3 mm, ♀♀ 6.4–7.3 mm. Coria with scattered calli varying in color from slightly paler than disk to distinctly paler; discoidal spots lacking; posterior margins weakly sinuous to broadly rounded. Breadth of abdomen at widest point ♂♂ 8.9–9.8 mm, ♀♀ 8.7–10.1 mm.

Color of legs somewhat lighter than dorsum; apical femoral spines strongly produced.

First gonocoxae moderately produced posteriorly; caudal angle overlapping ninth paratergites; mesal margins contiguous for almost entire length, divergent and somewhat rounded posteriorly (Fig. 39); breadth at widest point 1.2–1.4 mm; length from apex to base at meson 1.3–1.5 mm. Second gonocoxae with two longitudinal concavities, one on either side of meson; thin mesal longitudinal concavity sometimes present; width at base 1.0–1.2 mm; length at meson 0.6–0.8 mm.

Structure of pygophore and enclosed structures closely resembling that of *L. planiceps*, except dorsolateral parameral processes curve inward apically (Figs. 40, 41). Ventral length of male abdominal segments 3–6 at meson 0.5–0.7; 0.3; 0.1–0.2; 3.7–4.3 mm.

*Type*.—Apparently lost.

*Distribution*.—Guyana, Venezuela, Colombia, Panama, Curacao (type locality) and in the Lesser Antilles (Grenadines & St. Lucia).

*Comment*.—The most similar congener is *L. planiceps* from which it is distinguished by the genitalia in both sexes and the form of the humeri.

*Loxa haematica* (Herrich-Schaeffer, 1842) NOMEN DUBIUM

*Cimex haematicus* Herrich-Schaeffer, 1842, p. 70, tab. 203, fig. 636.

*Pentatoma haematicum*: Herrich-Schaeffer, 1844, p. 94.

*Loxa haematica*: Walker, 1867, p. 242—Stål, 1872, p. 36—Lethierry & Severin, 1893, p. 149—Kirkaldy, 1909, p. 96—Horvath, 1925, p. 324 (unknown species)—Piran, 1963, p. 337.

This species was unknown to Horvath, the type specimens being apparently lost. Recognition of this species is not possible on the basis of Herrich-Schaeffer's description and figure.

#### Acknowledgement

I am deeply indebted to the following individuals for the loan of material: Dr. W. R. Dolling, British Museum (Natural History); Dr. H. Dodge Engleman, Coco Solo, Panama Canal Zone; Dr. Richard C. Foreschner, United States National Museum; Dr. F. Mead, Florida State Collection of Arthropods; Dr. G. Peterson, Akademie der Landwirtschaftswissenschaften; Dr. D. C. Rentz, California Academy of Sciences; Dr. J. C. Schaffner, Texas A&M University; Dr. R. T. Schuh, American Museum of Natural History; Dr. A. Soos, Magyar Nemzeti Múzeum Allattara. I would especially like to thank Dr. A. Kaltenbach of the Naturhistorisches Museum Wien who, in addition to loaning specimens, compared the holotype of *L. assimilis* with specimens of *L. viridis* and *L. flavicollis* and figured the genital cup of *L. assimilis* for me.

I would like to express my deepest appreciation to Dr. L. H. Rolston, Louisiana State University, for constructive criticism and advice during the course of this revision. I am also obliged to Drs. R. A. Goyer, J. B. Graves, L. D. Newsom and B. H. Wilson, all of Louisiana State University, for their encouragement and criticism.

#### Literature Cited

- Alayo, P. 1967. Catálogo de la fauna de Cuba-XVIII-Los Hemipteros de Cuba-II Familia Pentatomidae. Mus. Felipe Poey Acad. Cienc. Cuba Trab. Divulg. 43:1-47, 9 pls.
- Amyot, C. J. B. and J. G. A. Serville. 1843. Histoire Naturelle des Insectes. Hémiptères. Paris. lxxvi + 681 pp., 12 pls.
- Barber, H. G. 1914. Insects of Florida II Hemiptera. Bull. Amer. Mus. Nat. Hist. 33:495-535.
- . 1939. Insects of Porto Rico and the Virgin Islands-Hemiptera-Heteroptera (excepting the Miridae and Corixidae). Sci. Surv. Porto Rico, N. Y. Acad. Sci. 14:263-441, 12 figs.
- , and S. C. Bruner. 1932. The Cydnidae and Pentatomidae of Cuba. J. Dept. Agric. Porto Rico 16:231-280, pls. 24-26.
- Becker, M. and J. Grazia-Vieira. 1971. Contribuição ao conhecimento da superfamília Pentatomoidea na Venezuela (Heteroptera). Iher. (Zool.) 40:3-26.
- Berg, C. 1884. Addenda et emmendanda ad Hemiptera Argentina. Bonariae. 213 pp.
- Blatchley, W. S. 1926. Heteroptera or true bugs of eastern North America with special reference to the faunas of Indiana and Florida. Indianapolis, The Nature Publishing Co. 1116 pp.
- Bruner, S. C. and H. G. Barber. 1949. List of the Pentatomidae of Cuba with the description

- of a new species (Hemiptera-Heteroptera). Mem. Soc. Cubana Hist. Nat., Havana 19:155-165.
- Buckup, L. 1961. Os Pentatomídeos do estado do Rio Grande do Sul (Brasil) (Hemiptera-Heteroptera-Pentatomidae). Iher. (Zool.) 16:5-23.
- Callan, E. McC. 1948. The Pentatomidae, Cydnidae and Scutelleridae of Trinidad, B.W.I. Proc. R. Entomol. Soc. London Ser. B Taxon. 17:115-124, 1 fig.
- Dallas, W. S. 1851. List of the specimens of Hemipterous insects in the collections of the British Museum. London. 2 pts., 592 pp., 15 pls.
- Distant, W. L. 1880-1892. Insecta. Rhynchota, Hemiptera-Heteroptera. In Godman, F. D. and O. Salvin, Biologia Centrali-Americana London, Vol. 1, xx + 462 pp. 39 pls.
- . 1899. Rhynchotal notes III Heteroptera: Discocephalinae and Pentatominae (part). Ann. Mag. Nat. Hist. (7)4:421-444.
- Drury, D. 1773. Illustrations of exotic entomology, containing upwards of six hundred and fifty figures and descriptions of foreign insects interspersed with remarks and reflections on their nature and properties. 3 vol. xxxix + 317 pp. London.
- Fabricius, J. C. 1781. Species insectorum exhibentes eorum differentias específicas, synonyma auctorum, loca natalia, metamorphosin adjectis observationibus, descriptionibus. Hamburgi et Kilonii. 2 vols.
- Fennah, R. G. 1935. A preliminary list of the Pentatomidae of Trinidad, B.W.I. Trop. Agr., Trinidad 12:192-194.
- Gmelin, J. F. 1788. Caroli a Linne Systema Naturae. Ed. 13. 1(4):2041-2224 (Hemiptera). Lipsiae.
- Grazia, J. 1968. Sobre o gênero *Chloropepla* Stål, 1867, com a descrição de uma nova espécie (Hemiptera, Pentatomidae, Pentatominae). Rev. Bras. Biol., 28(2):193-206, 21 figs.
- Grazia-Vieira, J. 1972. O genero *Mayrinia* Horvath, 1925 (Heteroptera, Pentatomidae, Pentatomini). Rev. Per. Entomol. 15(1):117-124, 21 figs.
- . 1973. Uma nova espécie de *Mayrinia* Horvath, 1925 (Heteroptera, Pentatomidae, Pentatomini). Iher. (Zool.) 42:25-33, 9 figs.
- Hart, C. A. 1919. The Pentatomidae of Illinois with keys to the nearctic genera. Illinois Nat. Hist. Surv., Bull. 13:157-223, pls. 16-21.
- Herrich-Schaeffer, G. A. W. 1842-1844. Die Wanzenartigen Insecten. Nurnberg. Vols. 6(1842) and 7(1844).
- Horvath, G. 1925. De Pentatomidarum genere *Loxa* Am. et Serv. et de novo genere ei affini. Ann. Mus. Nation. Hung. 22:307-328, 5 figs.
- Kirkaldy, G. W. 1909. Catalogue of the Hemiptera (Heteroptera). Vol. 1 Cimicidae. Berlin. xl + 392 pp.
- Lethierry, L. and G. Severin. 1893. Catalogue général des Hémiptères-Pentatomidae. Bruxelles. Vol. I, x + 286 pp.
- McDonald, F. J. D. 1966. The genitalia of North American Pentatomidae (Hemiptera: Heteroptera). Quaest. Entomol. 2:7-150.
- Palisot de Beauvois, A. M. F. J. 1805-1821. Insectes recueillis en Afrique et en Amérique dans les royaumes d'Oware et de Benin, à Saint-Dominique et dans les Etats-Unis pendant les années 1781-1797. Paris. 267 pp., 90 pls.
- Pirán, A. A. 1948. Contribucion al conocimiento de la dispersion geografica de los Hemipteros neotropicales. Acta Zool. Lilloana 5:5-17.
- . 1963. Hemiptera neotropica VII. Algunas especies nuevas o poco conocidas del noroeste Argentino. I. Acta Zool. Lilloana 19:335-341.
- . 1968. Hemiptera neotropica XI. Revta Soc. Ent. Argent. 30:17-25.
- Rolston, L. H. 1976. An evaluation of the generic assignment of some American Pentatomini (Hemiptera: Pentatomidae). J.N.Y. Entomol. Soc. 84(1):2-8.
- Ruckes, H. 1952. Some Scutelleroid Hemiptera of the Bahama Islands, British West Indies. Amer. Mus. Nov. 1591:1-9.

- Stål, C. 1860. Bidrag till Rio Janeiro-traktens hemipterafauna. Kongliga Svenska Vetenskaps-Akademiens Handlingar 2(7):1-84.
- . 1867. Bidrag till Hemipterernas Systematik. Conspectus generum Pentatomidum Americae. Ofversigt af Kongliga Svenska Vetenskaps-Akademiens Forhandlingar 24(7):522-534.
- . 1872. Enumeratio hemipterorum II. Kongliga Svenska Vetenskaps-Akademiens Handlingar 10(4):1-159.
- Torre-Bueno, J. R. de la. 1933. On Floridian Heteroptera, with new state records from the keys. Bull. Brooklyn Entomol. Soc. 18:23-31.
- . 1939. A synopsis of the Hemiptera-Heteroptera of America north of Mexico. Entomol. Amer. 19:141-310.
- Uhler, P. R. 1876. List of Hemiptera of the region west of the Mississippi River, including those collected during the Hayden explorations of 1873. Bull. U.S. Geol. Geog. Surv. Terr. 1:269-361, pls. 19-21.
- Van Duzee, E. P. 1901. Notes on some Hemiptera from British Guiana. Trans. Amer. Entomol. Soc. 27:343-352.
- . 1907. Notes on Jamaican Hemiptera: a report on a collection of Hemiptera made on the island of Jamaica in the Spring of 1906. Bull. Buffalo Soc. Nat. Sci. 8:1-79.
- . 1909. Observations on some Hemiptera taken in Florida in the spring of 1908. Bull. Buffalo Soc. Nat. Sci. 9:149-230.
- . 1917. Catalogue of the Hemiptera of America north of Mexico. Univ. California Pubs. Entomol. 2:xiv + 902 pp.
- Walker, F. 1867-1868. Catalogue of the specimens of Hemiptera-Heteroptera in the collection of the British Museum. Part II (1867), pp. 241-417. Part III (1868), pp. 418-599.
- Wolcott, G. N. 1936. "Insectae Borinquensis." A revised annotated check-list of the insects of Puerto Rico. J. Agr. Univ. Puerto Rico 20(1):1-627.
- . 1950-1951. The insects of Puerto Rico. J. Agr. Univ. Puerto Rico 32(1948):1-975.

### Footnotes

<sup>1</sup> Currently with the Department of Entomology, Texas A&M University, College Station, Texas 77843.

<sup>2</sup> Letters in parentheses indicate the number and position of labels with (a) being the topmost label next to the insect.